Menlo Park Notebook #10 [N-78-12-16]

This notebook covers the period December 1878-January 1879. Most of the entries are by Francis Upton. There are also entries by Edison and Charles Batchelor. Some entries have been signed by Edison. Almost all of the material relates to experiments on electric lighting. Included are calculations by Upton about generators and electric distribution systems, with a few calculations by Edison; notes and drawings of lamps; and notes and drawings of generators. There are also notes by Upton on miscellaneous subjects, from etheric force, electricity, magnetism, and phosphorescence to light and heat. Similar notes can be found in Menlo Park Notebook #15. The book contains 282 numbered pages.

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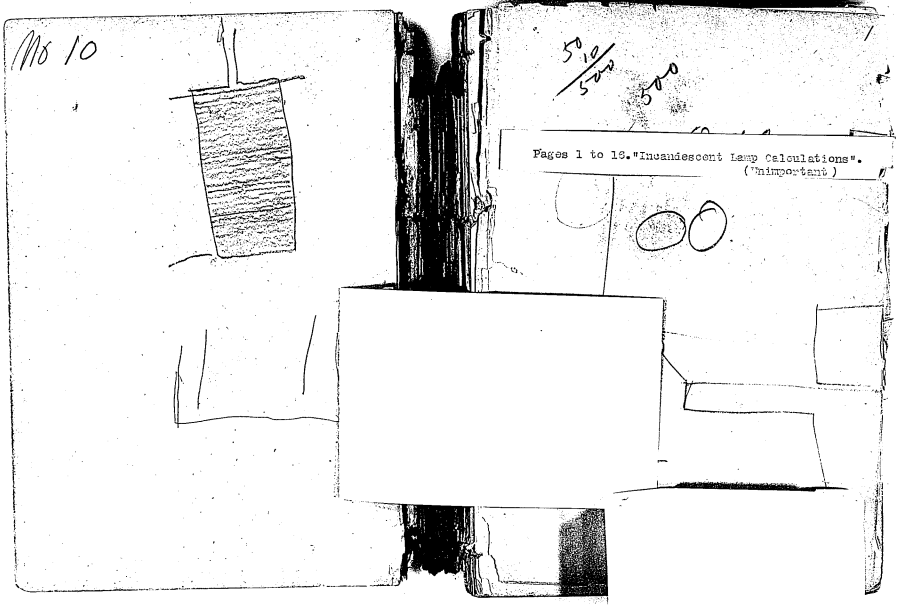
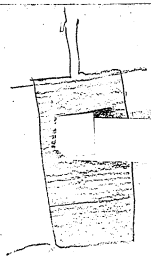

No 10
Pages 1 to 18."Incandescent Lamp Calculations".
("Unimportant")



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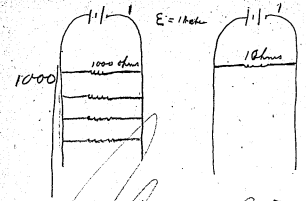


$\mathcal{E} = 1$ Heat $= R C^2$

$C = \frac{\mathcal{E}}{R + r}$

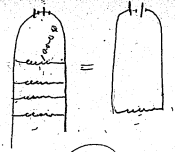
$\frac{1}{1000} + \frac{1}{10000}$

$\mathcal{E} =$ $C =$

$\mathcal{E} = 1 \quad C = X \quad R = 10000$ $r = 1$

$C = \frac{\mathcal{E}}{R + 10000}$

Heat $= \frac{\mathcal{E}^2}{1000^2}$ 1 ohm



100 lamps 1 ohm

$H = R C^2$

$C = \frac{E}{R+r}$

$E = 2$

$R = 1$

$r = 1$

$\frac{100}{100} \quad \frac{10,000}{100}$

$\frac{100}{10} \quad \frac{100^2}{10}$

10,000.

1	1.00
2	.50
4	.250
8	.25
16	.62
32	.25
64	.62

V

$\frac{1}{10000}$

$\frac{1}{10000} \quad 10000 = 1$

$1 = \frac{1}{100} = \frac{1}{100 x}$

$\frac{1}{10000} \times 10000 = 1$

1.1 ~~1 / 100 / 100~~

$C = \frac{\mathcal{E}}{\frac{x}{100} + 1} = \frac{1}{\frac{x}{100} + 1}$

$H_{heat} = \frac{1}{\frac{x}{100} + 1} \cdot \frac{1}{\frac{x}{100} + 1} \times$

$\frac{x}{\frac{x^2}{10000} + \frac{2x}{100} + 1} = \frac{1}{10101}$

$10101\,x = \frac{x^2}{10000} + \frac{2x}{100} + 1$

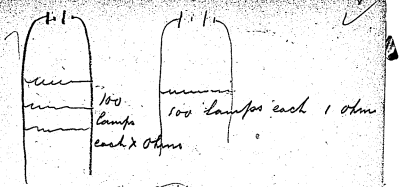
$10101 \cdot 10000 = x^2 + 200x + 10000$

$x^2 - 101.0 \cdot 1000 = 10000$

$x^2 - 10101 \cdot 0000$

continued

V



$\mathcal{E} = 1$ $H_{heat} = C^2 R$

$R = 100$ $R = 100$ $C = \frac{\mathcal{E}}{R + r}$

$r = 1$

$C = \frac{\mathcal{E}}{1 + 100} = \frac{1}{101}$ 100

$H_{heat} = \frac{1}{101} \times \frac{1}{101} \times 1$

$= \frac{1}{10101}$

$H_{heat} = \frac{\mathcal{E}}{1 +}$

$x - 5 \cdot 0000000 =$

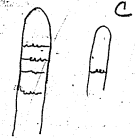
$\frac{1}{10000} \cdot \frac{1}{1}$

$10000 \times \frac{1}{10000} = \frac{1}{100}$

$\frac{1}{100} \cdot 1 = \frac{1}{100}$

Heat = C^2R

C in whole = 1



1 oz. Zinc plate

10000 in each

$\frac{10000}{100} = 100$ Ohms in all

$\frac{1}{100}$ of current in each

$\left(\frac{1}{100}\right)^2 = \frac{1}{10000}$

$\frac{1}{10000} \cdot 10000 = 1$ Heat in each limb

100 Ohms in all
1 Ohm in each limb
1 Current in each limb
$1 = 1 \times 1$ Heat in each limb

Heat = ~~I²R~~

$C = \frac{\varepsilon}{R}$

Heat = $C^2 R$

Heat

1 1 1 1 1 oz

100 100 100 100 $C = \frac{1}{2}$

$C = \frac{100}{100+100} = \frac{1}{2}$

$C = \frac{2\varepsilon}{R+r}$

$C = \frac{\varepsilon}{R+r}$

1 oz 1 1 1

$C = \frac{1}{1+1} = \frac{1}{2}$

$C = \frac{2}{1+2} = \frac{2}{3}$

1 1 1

$\frac{4}{3}$ oz $\frac{4}{3}$ oz $1\frac{2}{3}$

$1\frac{1}{3}$ $H = H\frac{1}{3}$ $1\frac{1}{3}$

$1\frac{1}{3}$ $1\frac{1}{3}$

100 X 100

$C = \frac{1}{2}$

Page 2 3.5 2 17

C^2R

$C = \frac{\mathcal{E}}{R}$

$C^2R =$

$\frac{\mathcal{E}^2}{R^2} R = \frac{\mathcal{E}^2}{R}$

$C^2R = \frac{\mathcal{E}^2}{R}$ $\mathcal{E}$

$C = \frac{\mathcal{E}}{R}$

$\frac{1}{14}\ 2 = \frac{1}{2}$

$\frac{2}{3} \cdot 3 =$

$\frac{4}{9} \cdot 3 = \frac{4}{3}$

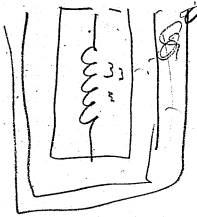
$\frac{2}{3}$

$1\ \frac{8}{3}$

$1\ 2\frac{2}{3}$

Joule

1842



$C = \frac{1}{1004}$

$\frac{1}{(1001)^2} \cdot 1001$

Nard

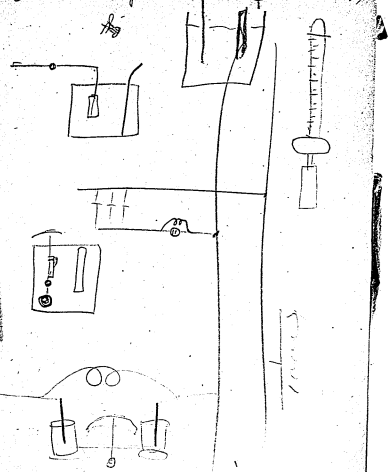
$\frac{1}{1001} \cdot$ 1274
3560
2120

$C = \frac{2}{1002}$

$\frac{4}{(1002)^2} \cdot 1002$

$\frac{4}{1002}$ $\frac{1}{250}$

Electric light — Meter Dec 20 17



Scale for measuring

$C = \frac{1}{1+1} = \frac{1}{2}$

$C = \frac{2}{2+2} = \frac{1}{2}$

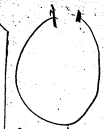
$\frac{1}{2}$ or

$C = \frac{1}{1+1} = \frac{1}{2}$ Volver

$C = \frac{2}{2+1} = \frac{2}{3}$

$r = 1$

$\mathcal{E} = 1$

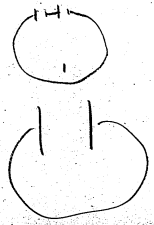


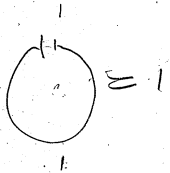
$C = \frac{\mathcal{E}}{R+r}$

$C = \frac{1}{1+1} = \frac{1}{2}$

$C = \frac{2}{2} = 1$

$C = \frac{2}{2+1} = \frac{2}{3}$

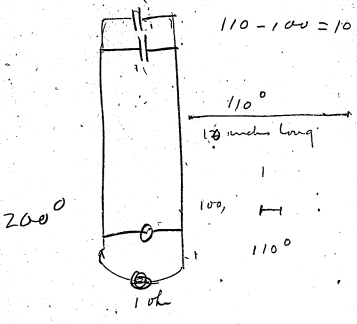




$= 1$

$$C = \frac{1}{\frac{1}{2}+1} = \frac{1}{\frac{3}{2}} = \frac{2}{3}$$

$1\frac{1}{3}$



2 mile $\frac{1}{4}$ = 20hm

$\frac{1}{10000}$ ① = 20

$\frac{1}{20000}$ $\frac{1}{1.6}$

$\frac{\pi D^2}{4}$ 16 | 20000 | 1250

$\frac{\pi D^2}{4}$ $\frac{1}{20000}$ 1.6 40 32 80 80

$\frac{\pi D^2}{4} = \frac{1}{10000}$ 12'5-0 1/3

$\frac{\pi D^2}{4} = \frac{20000}{10000}$ 4 | 350

1 / 5000

1000

10 inch 1000 / 2000

110

6 120

3 140 1000,

1½ 180 1600 2000

¾ 260

2 cubes

20.

40

110

100

¼

200 400 4000 2000 1000

30

15

7½

$C = \frac{E}{R+r}$

$C = \frac{1}{1+1} = \frac{1}{2}$

$C = \frac{1}{\frac{1}{30}+1} = \frac{30}{31}$

1 2

2 horse power Dec 16, 21

Cu. rod $\frac{1}{4}$ in diameter

Length 30 inches

~~1654~~

.1654

1000

12000 ! 30 :: .1654

4000 ~~16.1600~~

400. ! 1654

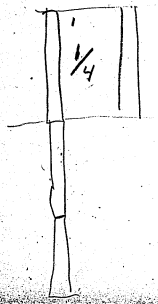
~~00.0400 35~~

10004

.0004

$\frac{413}{100000} = \frac{1}{2500}$

$\frac{1}{2500}$ 10000



12,000 : 30 :: .1654 :

400 : 1 :: .1654

$\frac{.1654}{400} = \frac{.00165\overline{4}}{4}$

.000413 Ohm

6046.5

12

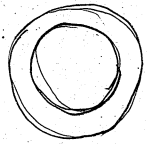
120930

60465

72558.

72558 : 30 :: 1 :

$\frac{1}{2500}$ ohm



$\frac{1}{4}$

12

~~8 inches~~

$\left(\frac{1}{4}\right)^2 = \frac{1}{86}$

$\frac{12}{16} = \frac{3}{4}$

$\left(\frac{1}{4}\right)^2 \pi$ $\frac{1}{16}$

$\frac{1}{2}(x)^2 \pi$ $\frac{12}{16} = \frac{3}{4}$

$\frac{\pi D}{4} = A$

$D = \frac{4}{\pi} A$

$= \frac{4}{\pi} \frac{3\pi}{16} = \frac{3}{4}$

3

$\frac{3}{4}$ $\frac{9}{16} \times \frac{1}{12} =$

$\left(\frac{9}{16}\right)$ $\left(\frac{3}{4}\right)^2$

$\frac{1}{4}$ 12

$\frac{1}{16}$ 12 area

$\frac{12}{16} = \sqrt{\frac{3}{4}}$

$\frac{1}{16}$ $\left(\frac{12}{16}\pi\right)$

$2\pi R$

$\pi R^2 = \pi \frac{D}{4}^2$

$\frac{1}{16}$ $\frac{1}{8}$ $\frac{1}{64}$ $\frac{3\pi}{16}$ $R = \frac{D}{2}$

$R^2 = \frac{D^2}{4}$

$\frac{12\pi}{64} = \frac{3\pi}{16}$

$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{16}$

$\frac{1}{8}$

$\frac{\pi D^2}{4}$ $\frac{1}{64}\pi$

64)3.1415 (.049

256

581

512

56 ends

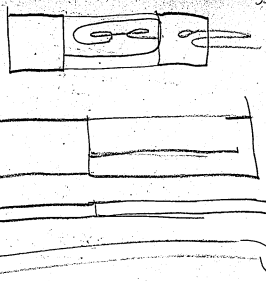
$\frac{1}{4}$

64) 0 .49

1

.05

$\frac{5}{100}$ $\frac{1}{20}$



960 Lumps 960 Lumps

480°

160

64 | 320.0 5

320

$\frac{1}{4}$

$\frac{\pi D^2}{4}$ $\frac{\pi \frac{1}{16}}{4}$

$\pi \frac{1}{64}$

64 / 3.1415(.04

$\frac{1}{20}$ $\frac{\frac{5}{100}}{20}$ = 3 inches

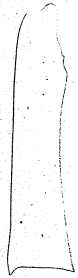
30

4 / 3.14
.785
30
2.3.550

2,355

23,55 7
3. $\frac{3}{4}$
20. $\frac{1}{2}$

23. $\frac{1}{2}$

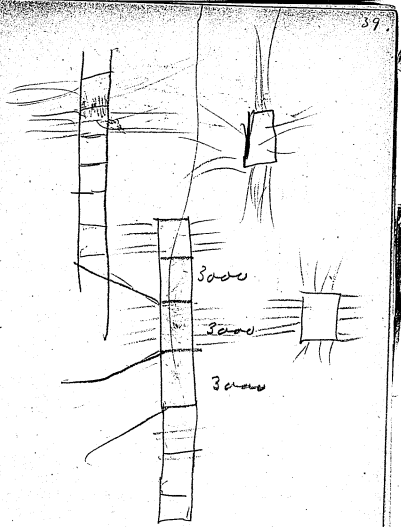


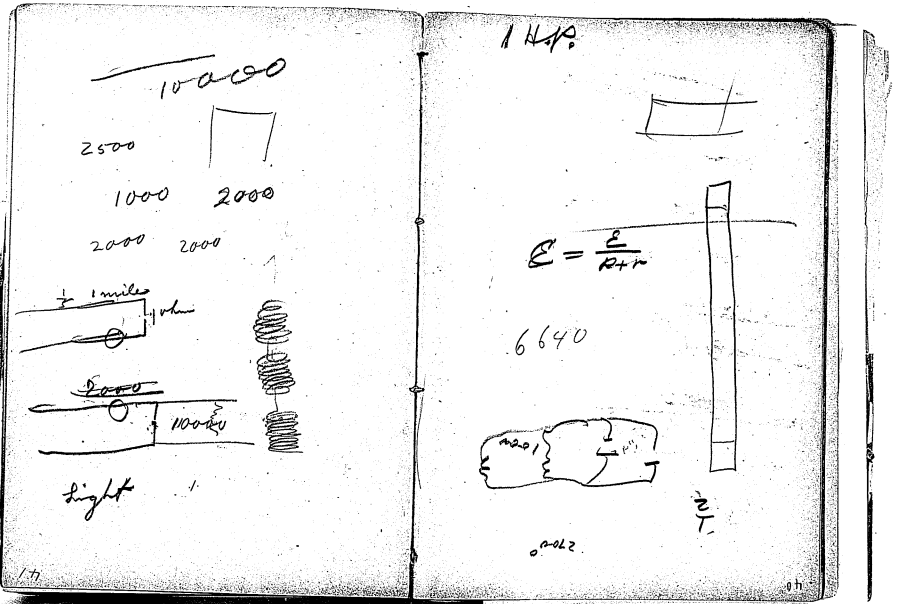
$\frac{3}{5}$ · 5.4

27 | 5.4

5.4) 250 (4
21.6
4.4

5.4) 270 (5



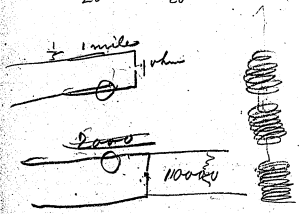

10000
2500
1000
2000
2000
2000
1 mile
1000 ft
light
1 H.P.
$E = \frac{e}{R+r}$
6640
2700

100000

2500

1000 2000

2000 2000

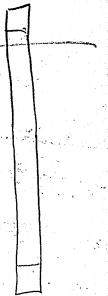


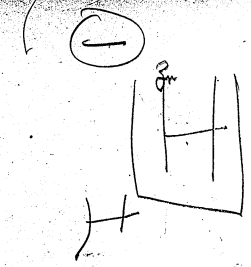
light

1 H.P.

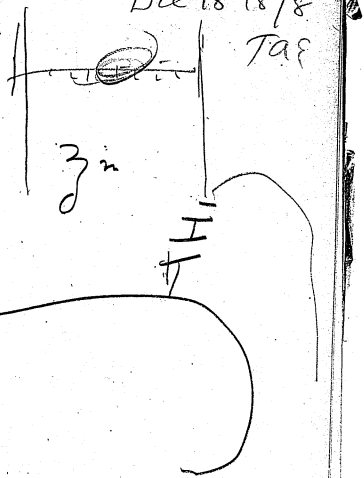
$E = \frac{\varepsilon}{R+r}$

6640





Dec 18 1878
TAE



Dec 18 1878
TAS

Space & dimensions to work

Dec 18 1878
TAS

200 20
120 20

18 C R
6
60

C = Q/R

I = 1/1

C = 1/1

Dec 18 1878
TAE

Dec 18 1878
TAE

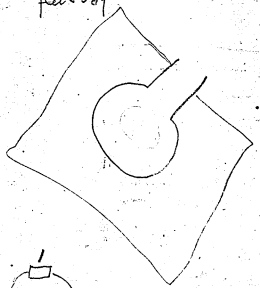
10 5 ohm
20,
10,

1 hyp. 1, EMF

1 ohm

60 55. 1

48



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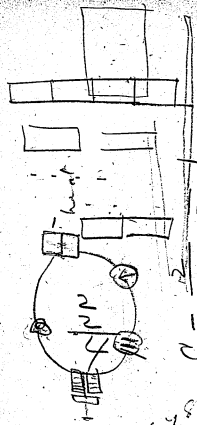

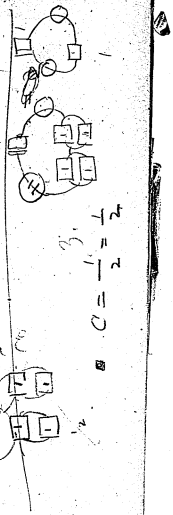

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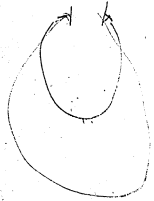
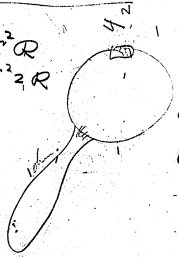


$C = \frac{\text{power}}{17.00}$

$C = \frac{\mathcal{E}}{R+r}$

$H = C^2 R$

$2H = C^2 2R$



$C = \frac{\mathcal{E}}{R+r}$

$C = \frac{r^2 \mathcal{E}}{2R}$

52

53

Qs. 4225 : 4356 (330
330
13068
13068
4221 / 143748 \ 340
12675
16998
16900
980

86
80
6450 : 4356 (340
340
14424
13668
8 / 14810 ~~49~~
8 / 1851
231-

4356 : 6400 : 340

340
25600
192
4356 / 217600 / 500
21780
0.

80
80
6400
8 / 17 0 0.
400

81 / 6.25

$G = .1$ ohm
$C_1 = 1.$ ohm
$D = .2$ "
$r = .2$

$R = 1.3 + .528$
$= 1.828$

$E = \frac{E}{1.828 + .2} = \frac{E}{2.028}$

$E = 2.028$

$C = 1$

14 s 3 4

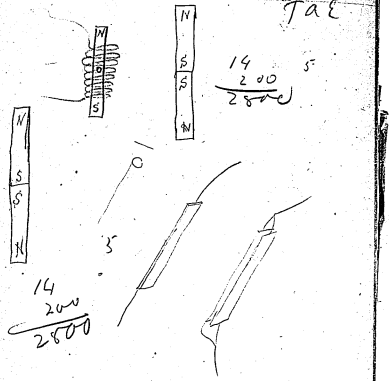
75
6
83

Exam

2.248 1.503

Dec 18 1878

Tat

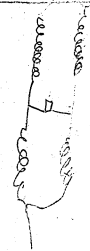


$\pi R^2 = A$

$\pi D = C$

$2\pi R \times \frac{1}{2} R = \pi R^2$

5.236 / 6 / 3.1416



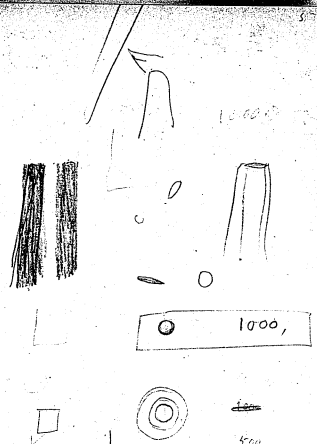
$\frac{1}{6}\pi D^3$

3/16

$4\pi R^2$

πD^2

$\frac{1}{6}(\pi D^2)\,R$



10

$\frac{3}{16}$ → .16) 3.0 (.183
16
140
134
60

2.183
.1091

16 ths

.0260

.026

10

πr^2

$4\pi R^2$

.026
.104
1.04

100°
200°
250

$\frac{3}{16}$ $\left(\frac{3}{16}\right)^2 \pi = A$

$\frac{9}{256}\pi = A$

9

16
16
96
16
256

256) 3.14159
9
282744 (.11
256
267
256
11 44

$\frac{1}{10}$ inch

$\frac{1}{10}$ inch 1000°. 5000°

1 inch 100°. 500°

820

$\frac{1}{12}$ / 6 0 0 0 0

12

720,000

15

3,6 0 0,0 0 0

72

10,8 0 0,0 0 0,0 0 0

23

11,000,000.

783,300.

1000

5 Q 4+

14) 3606

1200

15 1000

60

3.40

15 5/12

60.000

64

2 lbs

$\frac{1}{20}$ lt

1,120) 196000 (176.
1120
84000
7840
6600

1760

1.120
90

Dec 18 1878
TUE

65

10000 10000

2200 Cu ft Coal
40

destroyed 1340
From one ton 1300 destroyed to make 10000 cuft gas
1300 lbs = 10000 ft of gas
one hour
5

5) 10000
2000 = gas burners for one hour
= 30000 candles

1300 2) 1300
2 650

Dec 18 1878
TUE

650) 30000 (4
2600
4000

650
600 candles Jablochkoff

39.0.000
13

650 × 6 = 3900

650 × 90 = 58500

650 Horse power

6 lamps per horse.

6 × 15 candles " " = 90

650 × 90 = 58500 candles for 1300 lbs of coal

Dec 18 1878

Jui

772) 33000 (42

3088

2120

4

1.

Dec 18 1878

Jui

,035-5

33.
42
66
132
1386.

1386 lbs of Pt. heated in one

1386 degrees Fahr 1 degree

68

69

30	28	19
34	96	16
55		13
139	195	48
676	40	
48	46	
38	40	
151	126	

Dec 18 1878

Jas

$C = \frac{8}{3+2} = \frac{8}{5}$

$Heat = C^2R = 7.7$

$\left(\frac{8}{5}\right)^2 3 = \frac{64}{25} 3$

$25 \overline{)192} (7.7$
175
170

Heat = 7.7

$C = \frac{8}{2+6} = \frac{8}{8} = 1$

$Heat = C^2R = 1 \cdot 6 = 6$

Heat = 6.-

Dec 18 1878
JAE

Battery 2 Ohms
Lamps 3 Ohms
Electromotive 8
$\frac{1}{4}$ inch radiating surface

(2 / 1.6)

Battery 2 Ohms
Lamps 6 "
Electromotive 8
$\frac{1}{4}$ in radiating surface

Dec 18 1878
JAE

Dec 18 1878

Tag

Lamp = 6

$C = \frac{8}{1.6+6} = \frac{8}{7.6}$

7.6) 8.0 (1.05
7.6
400

1.05
1.05
525
105
1.10
6
6.60 = Heat

Battery 1.6
Lamp 3.0
E. T. 8

No 1

$\frac{1}{4}$ in

Dec 18 1878

Lamp 6 Tag

$C = \frac{8}{3+1.6} = \frac{8}{4.6}$

4.6) 8.0 (1.74
46
340
322
180

1.74
1.74
696
1218
174
3.0576
3
9.15 = Heat

9.15
No 1

$$C = \frac{\mathcal{E}}{R+r}$$

$$C = \frac{2\mathcal{E}}{R'+2r}$$

$$\frac{\mathcal{E}}{R+r} = \frac{2\mathcal{E}}{R'+2r}$$

$$R'+2r = 2R+2r$$

$$R' = 2R$$

$$C = \frac{\mathcal{E}}{\quad}$$

Dec 18 1878

$$C = \frac{\mathcal{E}}{R+r} \qquad \text{Tuesday}$$

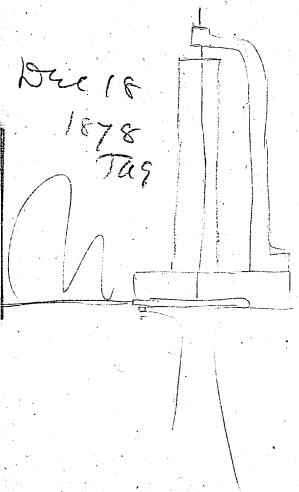
$$C = \frac{\mathcal{E}}{R'+\frac{r}{2}} = \frac{\mathcal{E}}{R+r}$$

$$R+r = R'+\frac{r}{2}$$

$$\frac{r}{2} = R'-R$$

$$r = 2(R'-R)$$

Dec 18
1878
Tag



Lamp with ~~6~~ 4 cm of 15/1000 wire with primer 12 inch long, ~~in~~ Glass tube round wire also a tube + 6th wire for screw

To record on glass rum by Wheatstone machine

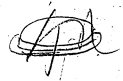
Small Key with buster for second

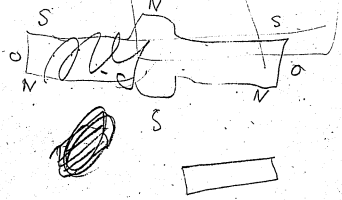
Dec 18 1878

TAS

$C = \frac{a}{R+r}$

Dec 18 1878

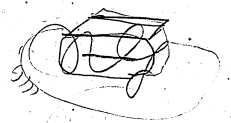


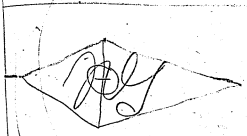


$C = \frac{\delta}{R+r} = \frac{2\delta}{2(R+r)}$

$= \frac{2\delta}{2R+2r}$

$2R+2r = 2l$





Dec 18

$$C = \frac{\mathcal{E}}{R + r}$$

$$C' = \frac{\mathcal{E}}{R' + r}$$

$$\frac{C}{R+r} = \frac{C'}{R'+r}$$

$$CR' + Cr = C'R + C'r$$

$$r = \frac{C'R - CR'}{C - C'}$$

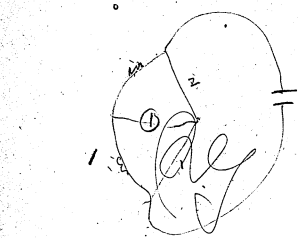
$$C = \frac{\frac{\mathcal{E}}{2}}{R + r} = \frac{\frac{\mathcal{E}}{2}}{R' + r}$$

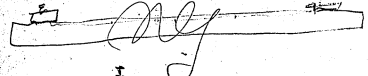
$$2R' + r = 2R + 2r$$

$$r = 2(R' - R)$$

Dec 18 1878

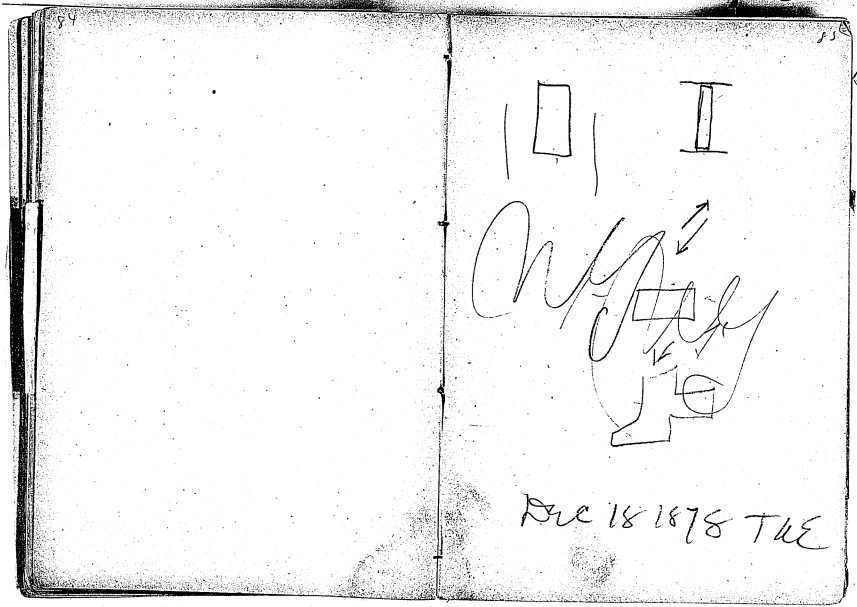
TAE

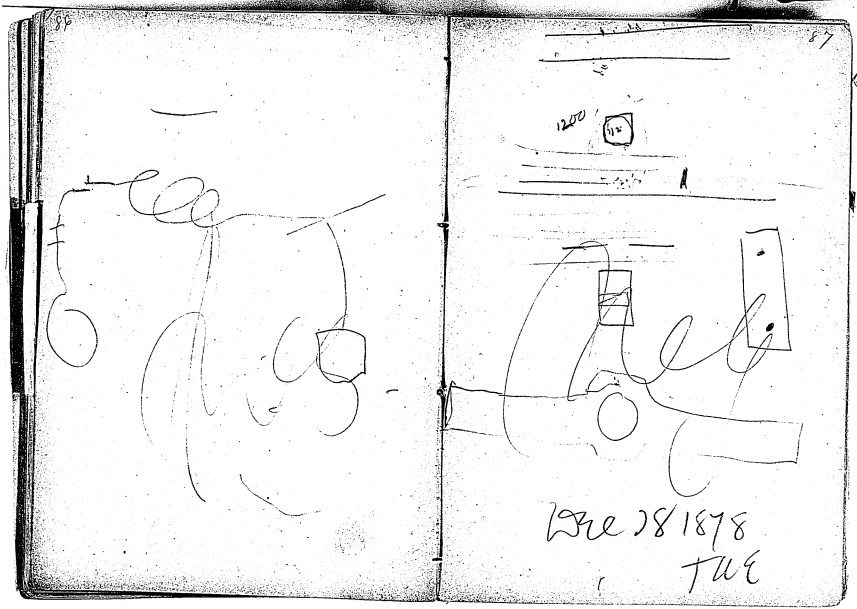


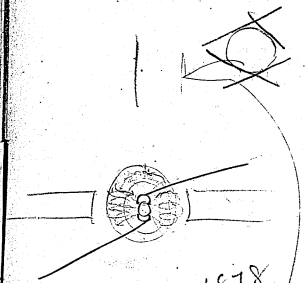


Dec 18 1878

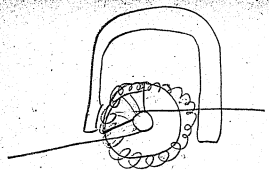
TAE

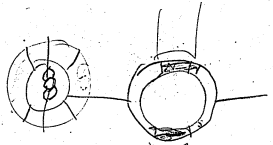

Dec 18 1878 TUE


86
87
1200
Dec 28 1878
TWC

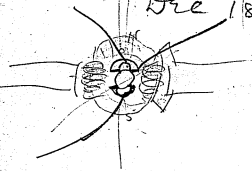


Dec 18 1878
Taf





Dec 18 1878
Taf



92

r = 10 Ohms

1 H.P. R = 10 Ohms

r = ~~8~~ Ohms R = 2 Ohms

$C = \frac{\mathcal{E}}{R+r} = 1$

C^2 Dec 18 1878 Tas

3.06
.10
30.06

1.75
1.75
.875
1225
175
3.06 25

93

1 Cell of # r = 10 Ohms

1 " " r = 2 Ohms

10 Ohms outside

$\mathcal{E} = 20$

$C = \frac{20}{10+10} = \frac{1}{20} = 1$

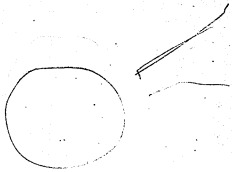
$C = \frac{20}{10+2} = \frac{20}{12} = 1\frac{3}{4}$

C = Dec 18 1878 Tas.

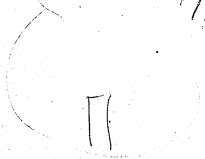
$1 \cdot 20 = 20 = 1$

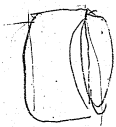
$(1\frac{3}{4})^2 \cdot 12 = 36.72$

3.06 1¾ 36
.12 20
36.72



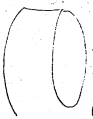
Dec 18 1878
Tag





Arms for cooling

Dec 18
1878 Tag



in the hand

No force of granulation
Condition of muscle

Examine

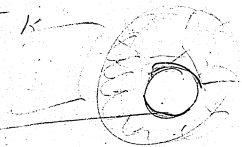
Cut down useless resistance

Bigger wire

Coiled

Dec 18 78

TAE



From very rare use knowledge of Elec.

10 8 2 10

$C = \frac{8 \cdot 1}{2+10} = \frac{1}{2}$

10 Dec 18/1878

TAE

10 Ohm machine

10 " outside

1 H.P.

Effect 200 Colories in all

1 cm

10 2

$12C^2 = 200$

$C^2 =$

12)200 (166

12

80

72

80

166

34

98

C^2 Heat $= C^2 R$

$(10+10) = 20$

$\overline{20+20}$

$\frac{1}{10+10} = \frac{1}{20}$ = 1 H.P.

99

$\frac{1}{400} \times 20 = \frac{1}{20}$ Heat

$\frac{2}{20+20} = \frac{1}{20}$ 2 H.P.

$\frac{1}{400} \times 40 = \frac{1}{10}$ Heat

$C = \frac{E}{R} = \frac{2E}{2R}$

Dec 18 1878

T. A. E.

Electric Light Dec 18th 1901

Chas Wetherbee

Small Gramme Machine from Princeton heats a Platinum wire to dull red (only just see it) 22 5/8 inches long

11 cells Carbon + H large battery (pretty much played out) is exactly equal to it

Size of Platinum wire .01

Length 22 5/8 inches

Resistance 2.3 ohms

11 cells made new heat 35 1/4 in wire

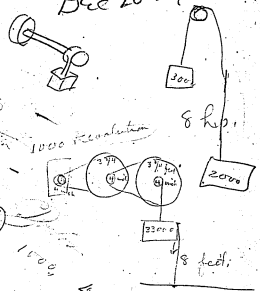
of 3.47 ohms

8 cells = the Gramme

102

Bell telephone with

Dec 20 1878 Taf



Boston 12.3.

7.5.0

12.3.000

33000

Boston

Boston

Boston

Boston

103

8 000 0

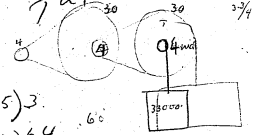
1 12.5 8 inch

2000 feet

150.

Dec 20 1878

Taf



125) 3. 60

264

1. 90 90 810.

20 60 120.

33 33 99 99 1089

33000 (132.

250

800

750

500

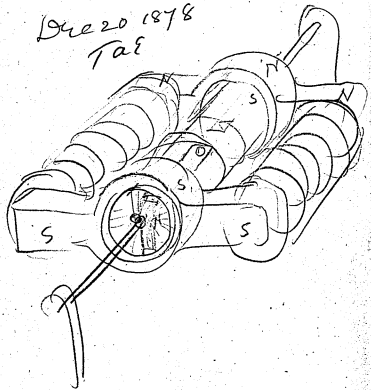
20 20 400

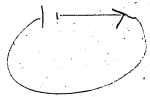
30 30 900

Resistance with wire

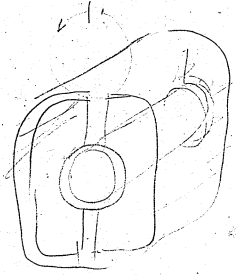
.9 Ohm

Dec 20 1878
TAE





Dec 20
1878 TAE



66 Cells per minute

5.5 : 9 :: 90

9

5.5) 81.0 (14.1

55

260

226

400

Dec 20 1878 Tel

3000

12

140-00,

7/24 .21,

Gramme Mach with 100 Ohms resistance

90 turns per min 5.5

2044 " " " 11

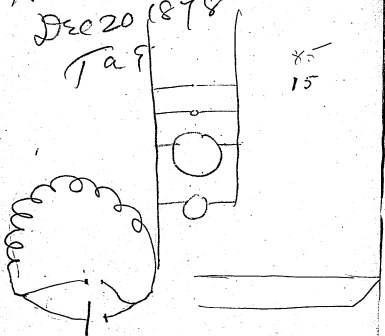
~~15.5~~ ~~9~~

180 11.5

Dec 20 1878

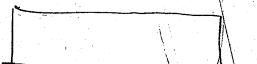
Tap

15



85
15

15/85 = 85/100
75
100



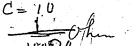
Dec 20 1878 TWE

Heat or Temperature wanted = C^2R

Heat = 1 unit

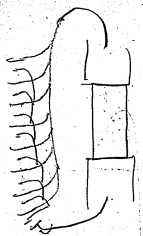
$(10^2) \frac{1}{100} = 1$

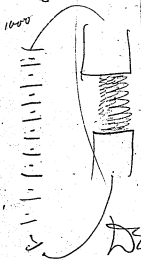
C = 10



R = 10

Current = 10





Wanted heat = 1

1 1 = 1

1 Ohm

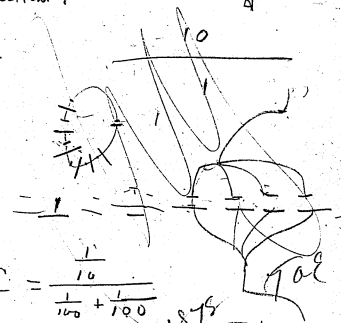
Current = 1

Dec 20 1878
TWE

Heat =
10 H
Current 10 H

$\frac{1}{100}$ ohm

Current 1


10
1
1
1

Heat = 1

Current = 1.0e

$\frac{1}{100000}$

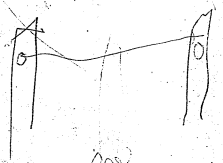
Current = 1

Heat = 1

Dec 20 1878 TAE

$100 =$ $\frac{1}{10000} + \frac{1}{0.0}$

$\frac{1}{100}$ $\frac{1}{99}$ $\frac{1}{100}$



Dec 20 1878

TAE

Ethmic force.

If it were electricity of high tension there would be very small heating effects for even large sparks. This force will cause iron to scintillate when the connection is made across the a file.

When a magnet is made and remarks the whole axis around it is placed in a diamagnetic condition

that is force has been
exerted to bring it, Thus
when

Dec 20 1878
Taf

116

Relays made short
20 as to prevent conduction
answer which you have.

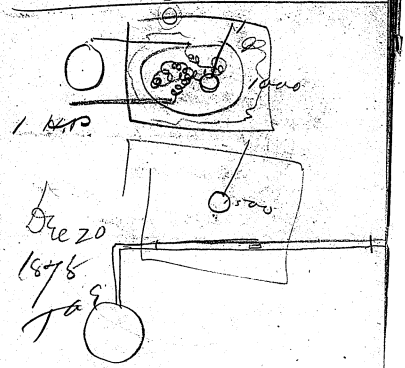
Cost per horse power 1 ct per hour
(8/10)

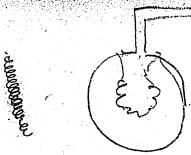
3.65
10 hours a day
36.50
10 horse power is a machine
365.00
interest 10%
365.00
36.50
3.65 per year

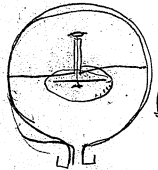
Dre 20 1876
Tue

117

1500
4/10 1520





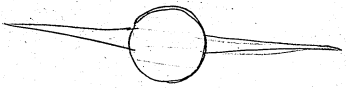


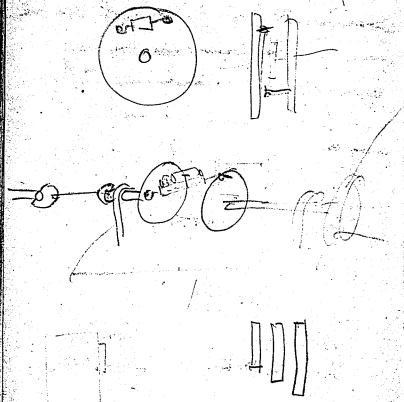
Dec 20 1878

Tait

Dec 20 1878

Tait





Dec 20 1878
Tar

Useless friction, as in the 12 commutators, is much worse in a ~~tension~~ quantity machine than in a tension machine

Owing to diff % of loss

Machine 100 Ohm
Commutator 1 "
1% loss

Machine 1 100 % loss
Commutator 1 " of the total

Dec 20 1878
Tar

12" Wire brush commutators used to prevent [illegible] vibrations. This could be effected with coil connected with rubber.

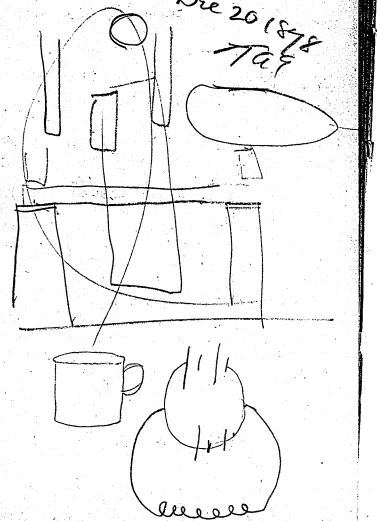
Current is proportional to the weakest field magnet. The same as in induction currents

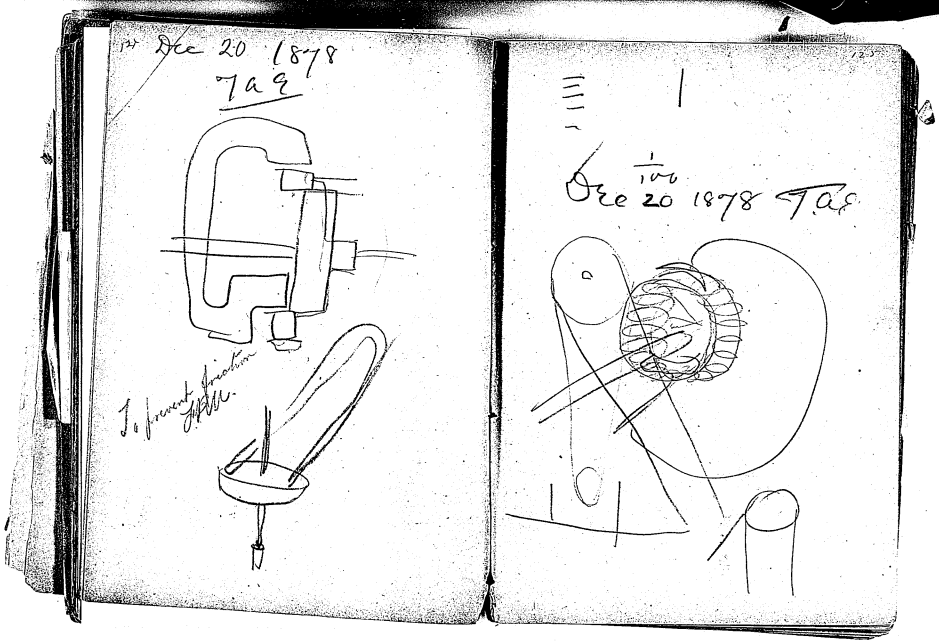
If the magnets vary the friction will be increased to run the machine at a higher rate.

Dec 20 1878
Tue

123

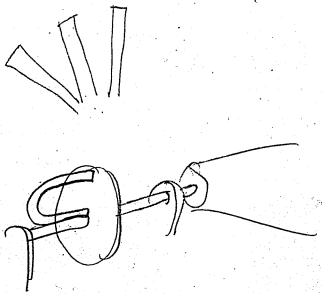
Dec 20 1878
Tue




Dec 20 1878
Tag
J. Prevost Inventor
Dec 20 1878 Tag

126

Dec 27 1878
Tait



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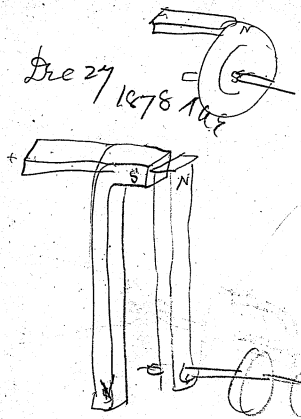
Dec 27 1878 Tait



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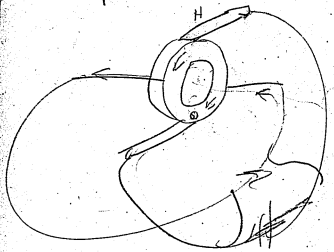

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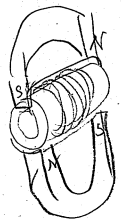
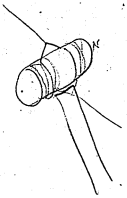
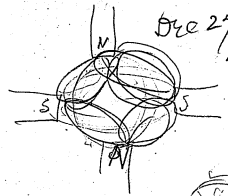
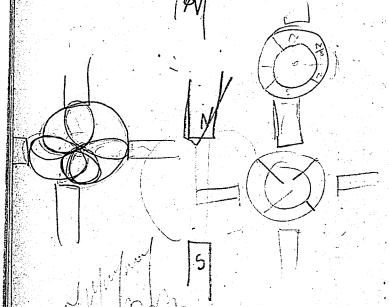




Dec 27 1878
T.A.E





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6
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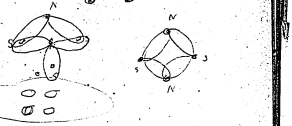
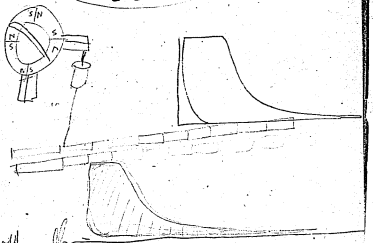
1000
12/18000.
1500

Dec. 27 1878
TAE

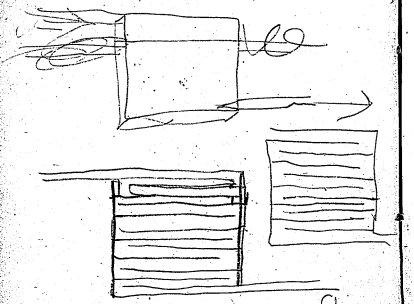




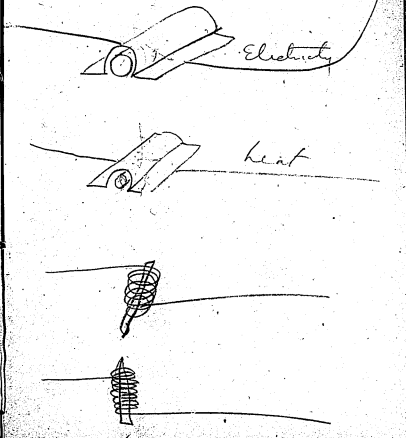
Heat transmitted

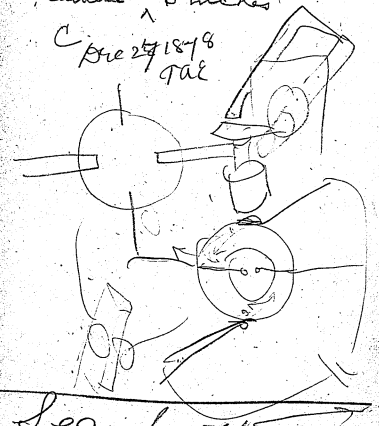
Elec " Dec 24 1878 FAE

Elec on tram round trim



Dec 24 1878 FAE





1. Resistance of bobbins H R
2. Proportion of field magnet to bobbin H M
3. External resistance W
4. Total heat in machine H
5. Total heat in ~~field~~ outside W
6. Heat in field magnet due to above cooling H. M Dec 27 1878 TAE
7. Heat in ring bobbins due to cooling H. R Cases. Small radiating surfaces Prevention Rotation and bringing air currents to the coils
8. Heat by demagnitization of the case H. R
9. Heat given off when generated in coil of field H. R
10. Resistance of commutators
11. Heat in field magnets H. M due to the passage of variable magnetic across

126

Dec 27 1878

Tar

10 Cement

16

$\frac{1}{100}$

$\frac{1}{20}$

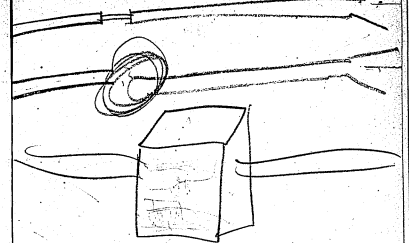
$1 = \frac{1}{1+1}$

$1 = \frac{1}{\frac{\frac{1}{10}}{\frac{1}{10000}}}$

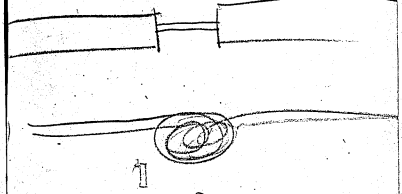
$\frac{1}{10000}$ 1000 Cells

$C = \frac{\frac{1}{10}}{\frac{1}{10000} + \frac{1}{10000}} = 500$

1000 local action



Dec 28 1878 Tar



Dec 28 1878

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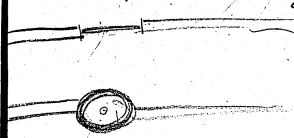
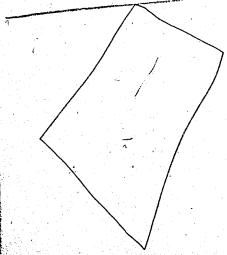


95. 5. 10.



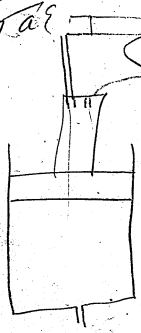
Light 24 Dec 25 1878 A.J.

for the eye, it could not have been detected by any known reaction, except the decomposition of a few salts and a slight undulation on the thermopile. Suppose the rays were ~~behaved~~ to light as they are to chemical rays ~~it would have~~ and had eyes which only measured heat rays, it would have probably taken ~~a~~ many years before the light would have been missed on the doctrine of the conservation of Energy

For example only $\frac{1}{1000}$ of the Energy of a gas flame is given off in ~~heat~~ light, and the experiments for measuring the energy of a flame show more probable error than this.

Dec 25 1878
T.A.E.

Dec 28 1878
TAE



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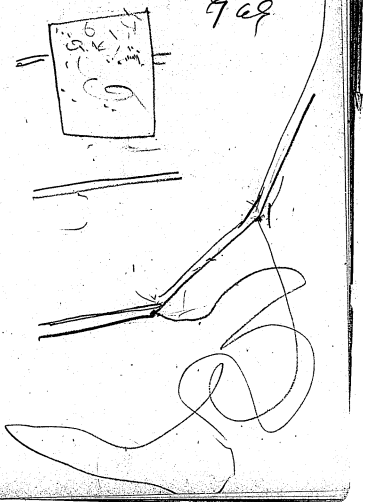
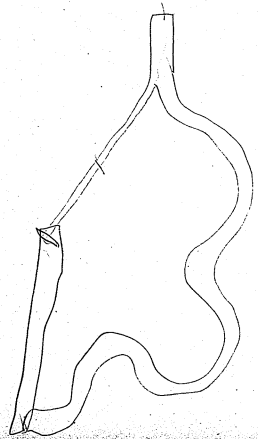
TAE





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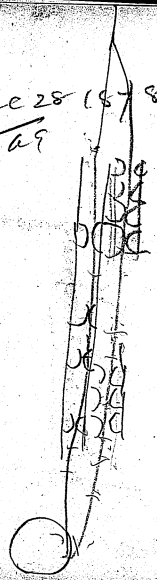
Dec 28 1878



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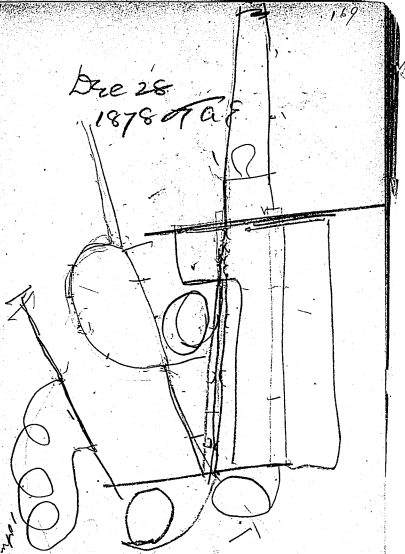
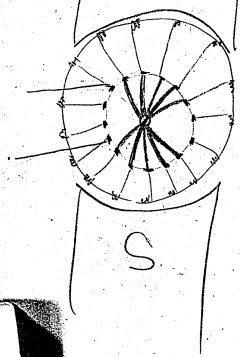
Dec 28
1878



Magneto Electric Machine

Jan, 1st 1878

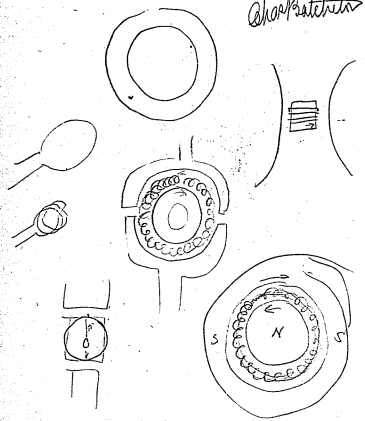
Chas Batchelor

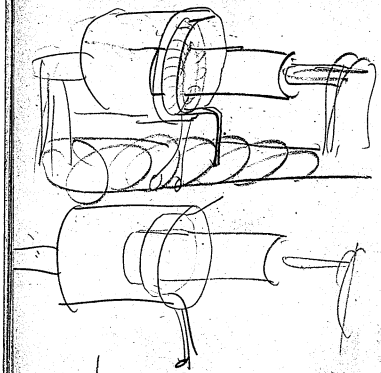


Dec 28. 1878

Tate

Chas Batchelor



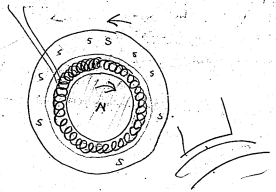


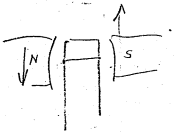
Dec 28 1878

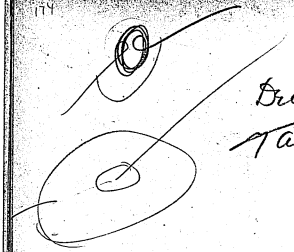
Tue

Dec 28 1878

Tue







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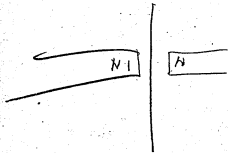

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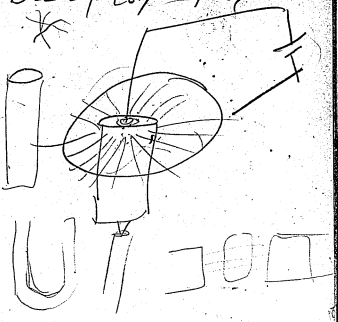

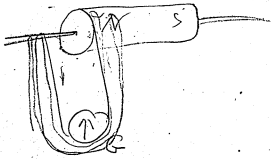

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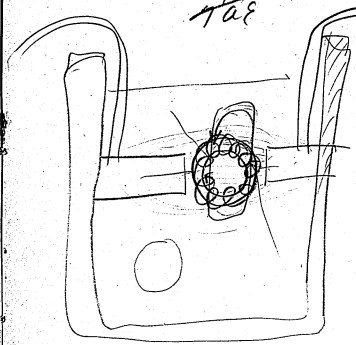
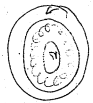
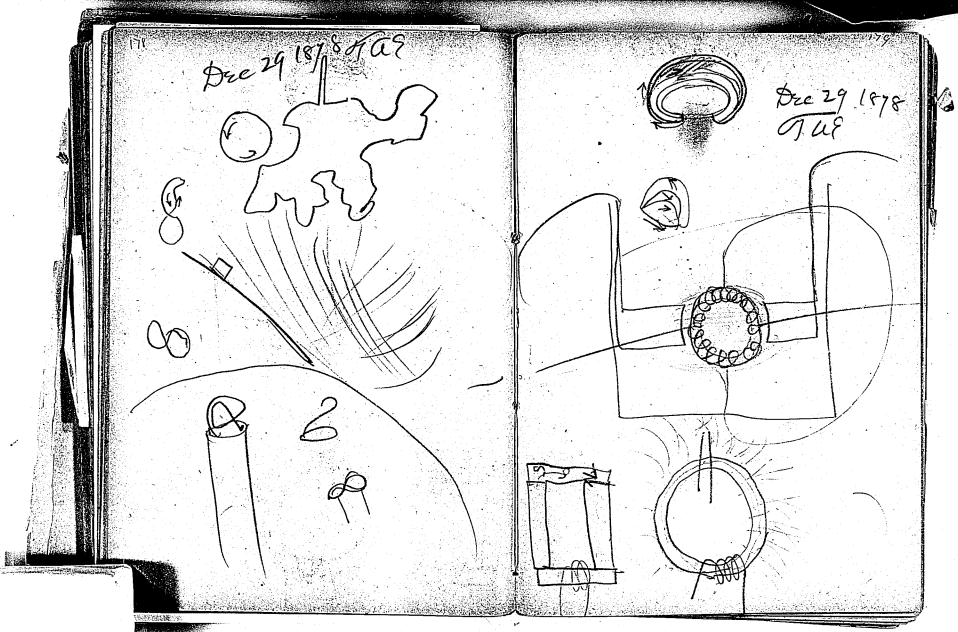
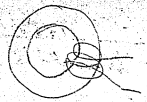





Dec 29 1878 Sat
Dec 29 1878
Sat



Dec 29 1878
AGE

Ex. Take a bar of steel hardened perfectly evenly carry a coil about one fast for $\frac{1}{4}$ of the whole. ✳ Pass a current and then break the the bar when it has ceased and see if there are poles.

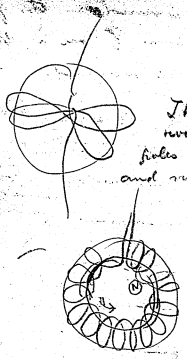
✳ Better coil evenly entirely round and move the coil if possible

Dec 29 1878
AGE

It would best travel faster up or down ~~or~~ on the armature

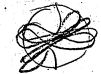
When a Bell telephone a motion is given to one diaphragm the other in answering will give a return current when it returns and as an echo as it were, will be made and a humming sound will result.

In clocks the pendulum will pick up earth currents and then they will change their rates of movement if their direction is changed

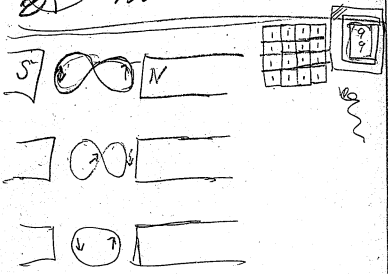


Dec 29 1878
Gat

Wire wound in the form
of a figure 8 on a wheel
and revolved



No Current



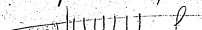
Dec 29 1878
Gat

Phosphorescence may be called the induction of light. The induction of Elec. means that a mine has had its matter put under a strain which when removed gives a current. So any substance when exposed to light absorbs it and when the light is removed gives it out as phosphorescence

5 m 650 W miles only the distance of the atmosphere

Dec 29 1878
TAE

Dec 29. 1878 TAE



5 m spectrum

1497 4

Lines 1478 projects outward of spectrum

When looking through the ghost at the refraction angle of Elec at spectroscope in a gas flame, the Nm & notice that light strikes reversed from across the spectrum. He noticed that a small cloud of ave the same effect and surrounded that the phenomena was due to invisible vapor in the air

Dec 29
1878
Tag

Diffraction
grating by rotation

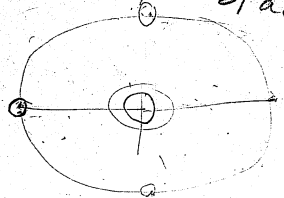
182.000)

~~2~~ 9 0 0 (

60 | 450

7 0

Dec 29 1878 ~~Tag~~



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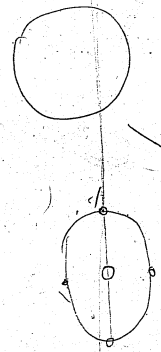

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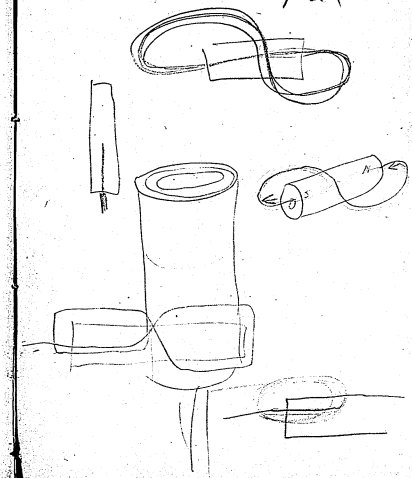
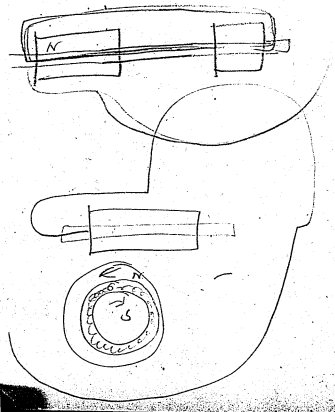


Dec 30 1878

TAE



Dec 30 1878

TAE

Portland Portchester

Port Portland

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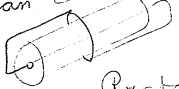
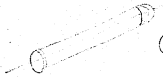
Bostonian Protochonde



Protochonde



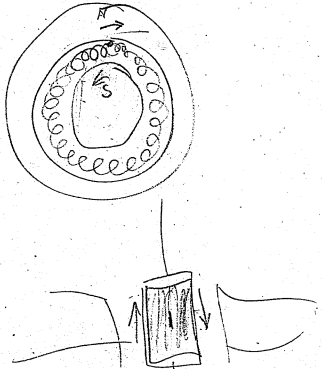
Protochonde

Boston

192

Dec 30 1878

Tas



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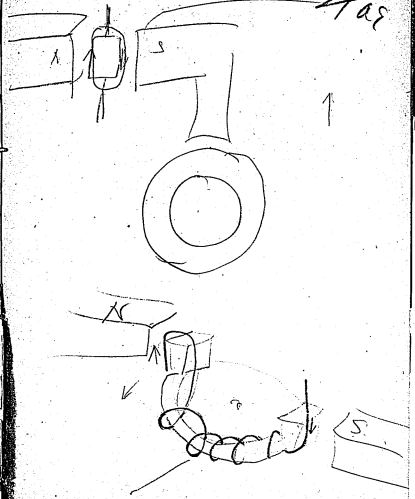
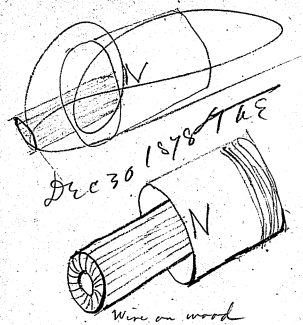


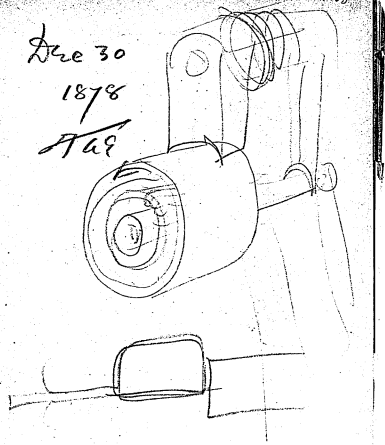


Dec 30 1878 Tue

Wire on wood

Coil revolved and no current as it ought to be.

Dec 30
1878
Tue



A electrometer may be considered as a galvanometer of great resistance. For example a 20.000 Ohm galvanometer will give indications exactly corresponding to the electromotive force of a battery. If we considered that we take a galvanometer which works with a resistance equal to the air leakage of a charged plate it must have a resistance to be counted by the ~~hundreds~~ hundreds of thousand of Ohms. All ordinary resistances would be re-

glected in comparison.

The electromotive force is dependent on the chemical force existing between the substances and its exciting liquid or solid. The current depends on the number of molecules changing condition

202

Dec 30 1878

N

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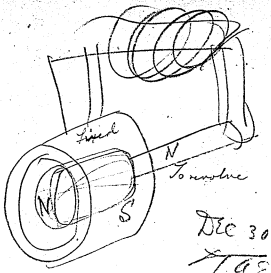
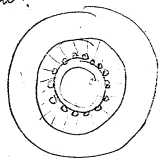


Dec 30 1878

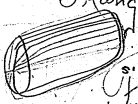
No current



Dec 30 1878

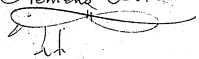
Upton

Upton Francis



Siemens Alternic

Siemens Alternick

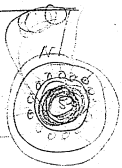


Dec 30 1878

Francis Upton

Peabody

Peabody



Dec 30 1878

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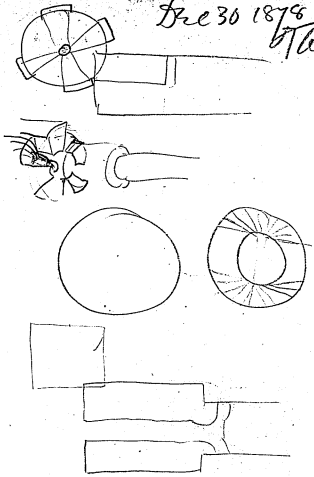

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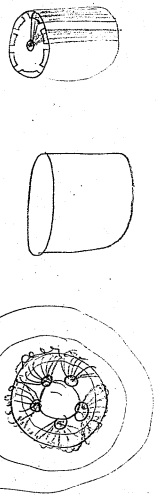
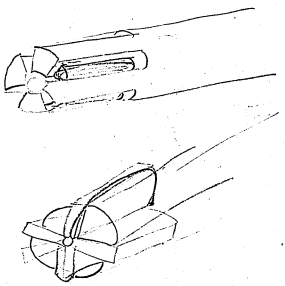
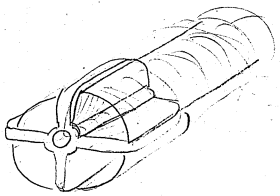


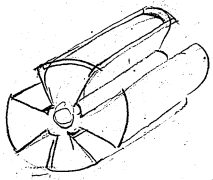
Dec 30 1874

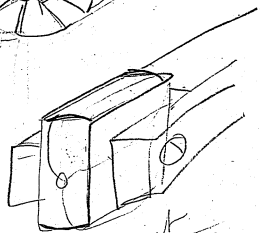




Dec 30 1878

Tag

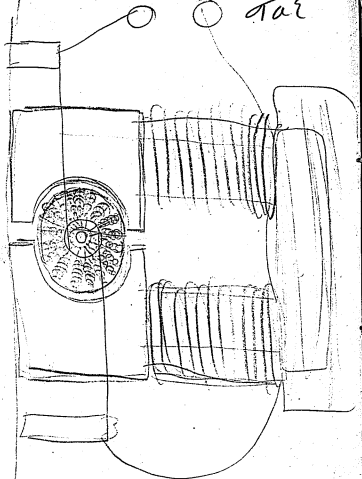




No current

Dec 30 1878

Dale



Dec 30 1878

Dale

Interchange Note Book No. 10.

Pages 212 to 215.

Dynamo Machine.

Gas Lighting Patent:

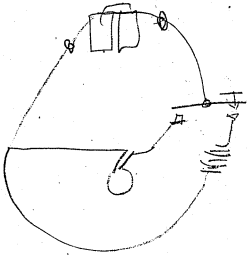
200,861

Dec 30 1878

dtaf

Dec 30 1878

dtaf



Dec 30 1874

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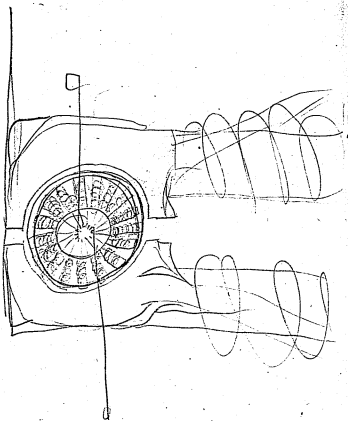

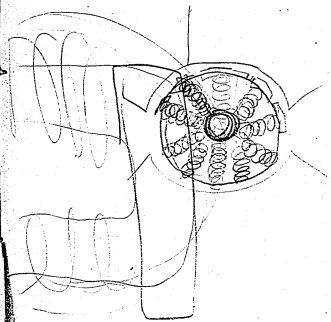

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Dec 30 1878

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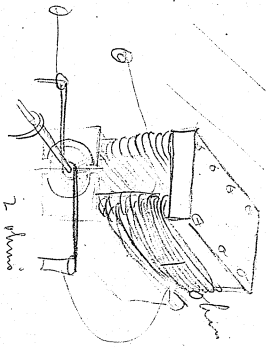

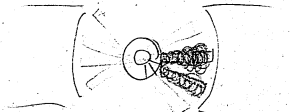

Annatum 879

Dec 30 1878

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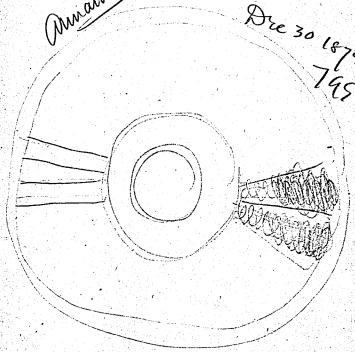
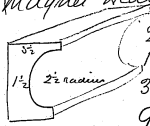


Mess magnets Mach
Armature Cylinder

9 in long
5 in ~~long~~ frames
¼ in thick

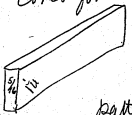
Steel for same
9 in long
½ in thick
round solid

Magnet Heads



2½ radius
1½ thick
3½ broad.
9 in long

Cores for Armature Spools



1¼ in deep. (long)
5/16 in thick
wide

pattern

Pitch of thread 10

Wheel (driving)

Diam - 9'61 ~

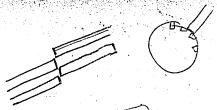
Pitch " 9·55 ~

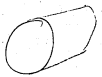
Width 5/8 ~

hole in hub 1 in

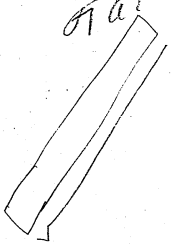
Six spokes

300 teeth (spiral cut)

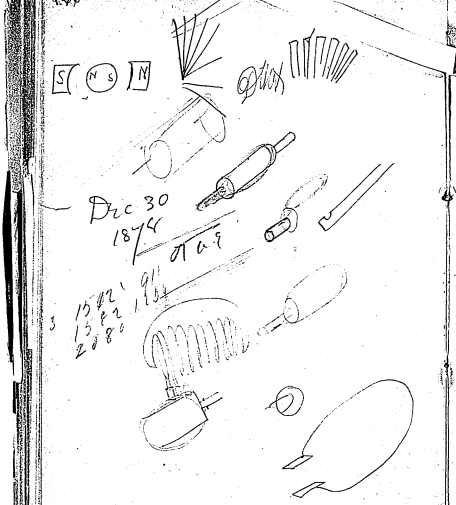




Dec 30 1878



Armatures for series
Edison Armature
Siemens Armature
Gramme Armature
Siemens Armature with
stationary magnet



Chas Batchelor Dec 31st 1878

Edisons Magneto Electric Mach.

1 Commutator finely divided

2 Armature must be made to revolve round a Stationery core so

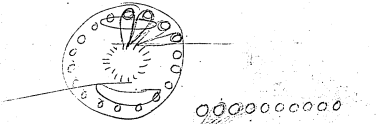
3 The Stationery core must be wound with wire and put in circuit with field magnets thus putting parts acted on in most concentrated part

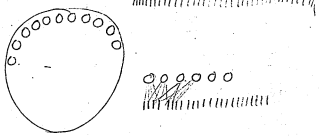
4 The armature & poles will then act thus :-

So that we throw loops through a very concentrated field

229

Dec 31 1878





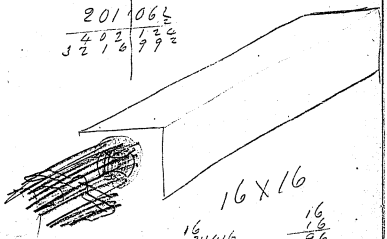
229

Edison's Mag. Elec Generator Dec 31st 1878

5

.2617 lbs.

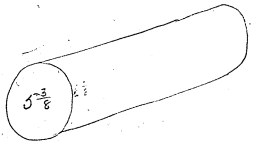
201	061
402	122
321679	



16 X 16

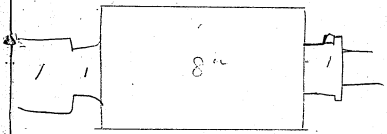
16	16
3.1416	16
50.2656	96
	256.00

3210	
.2607	
22579	
19302	
6434	
838671 9	

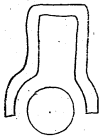


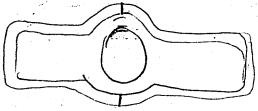
5 3/8 X 16 ~~X~~ 4

2 11/16 X 8 X 4



1/2





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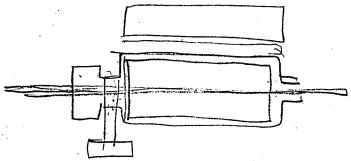

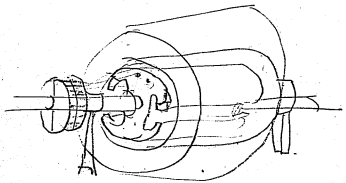

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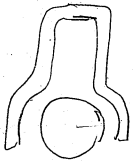

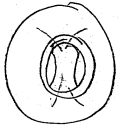

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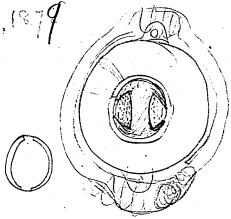

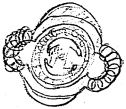

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Jan 1 1879
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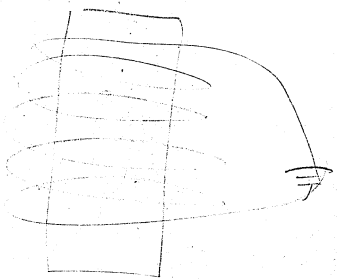

Jan 1 1879
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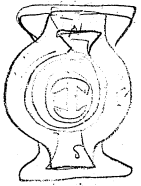
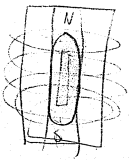
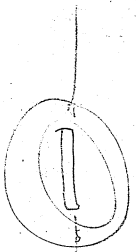
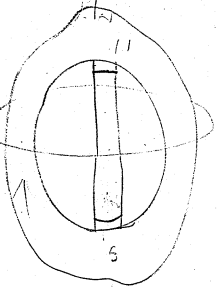
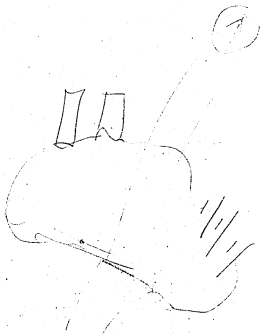


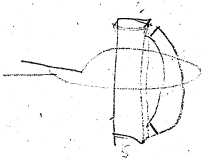


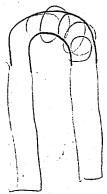


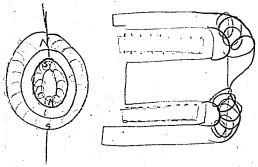


46° 15'
45° 30'





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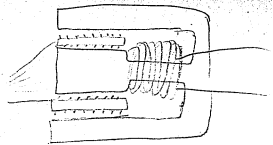

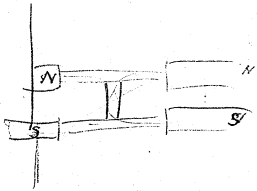
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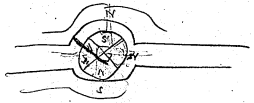
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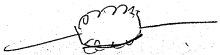

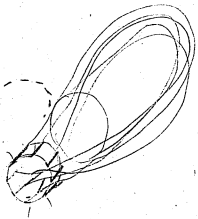

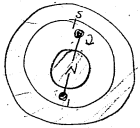
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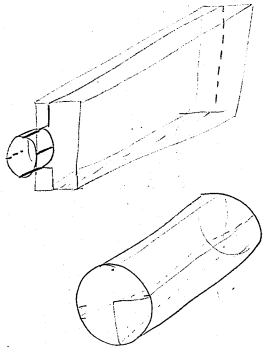
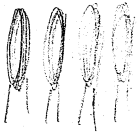
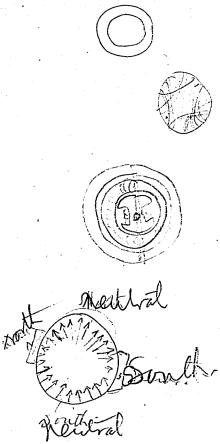


Electro Magnetic Mach.

Jan 1 1849

Charles Peterson

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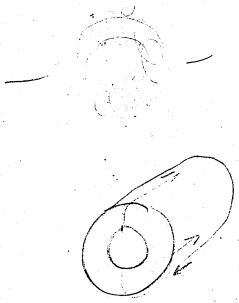

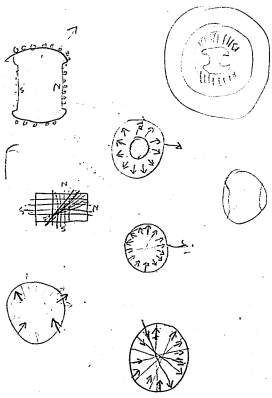

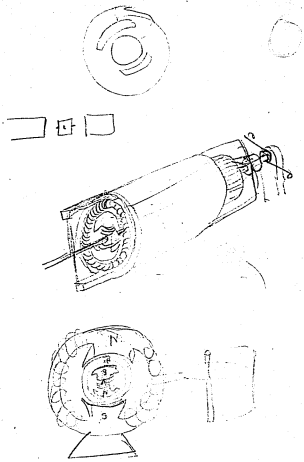
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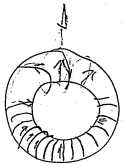

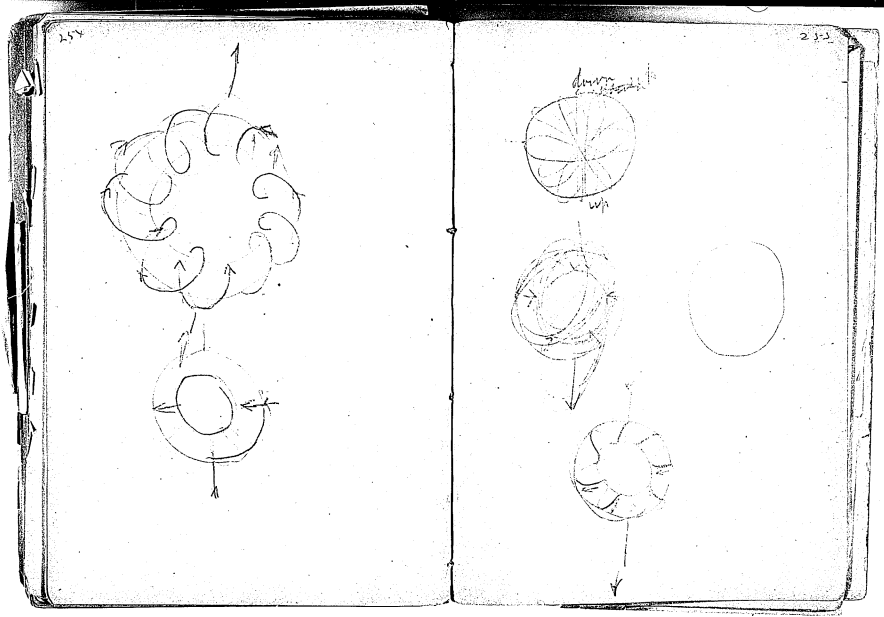

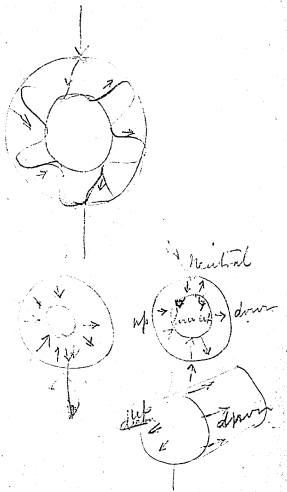
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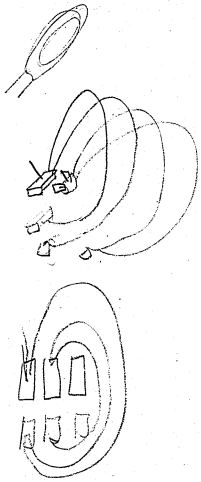
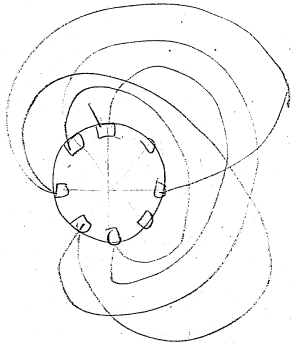
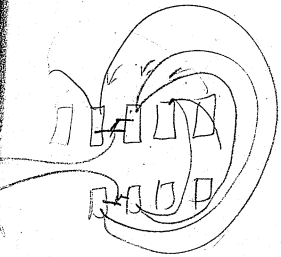
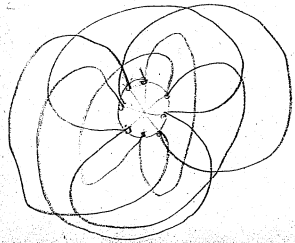
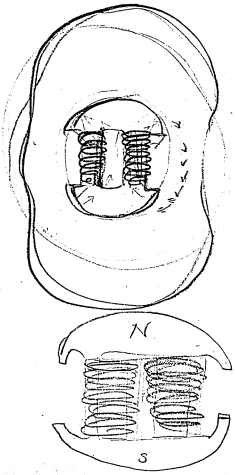
up
down







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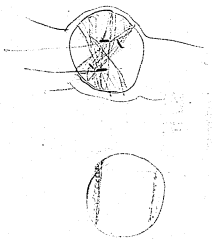

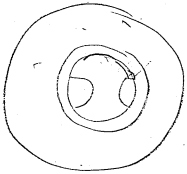

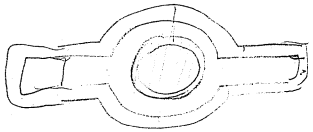

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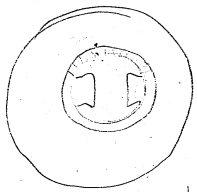

2

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16.

16
10
96
96
96

52

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2
$3\frac{1}{2}$

$\frac{1}{2}$

$\frac{3}{4}$ 21.

2
4

$10\frac{2}{2}$
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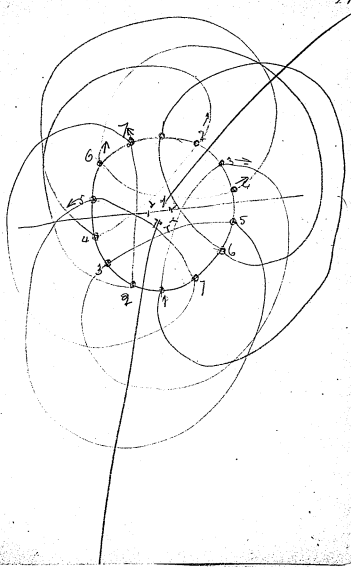
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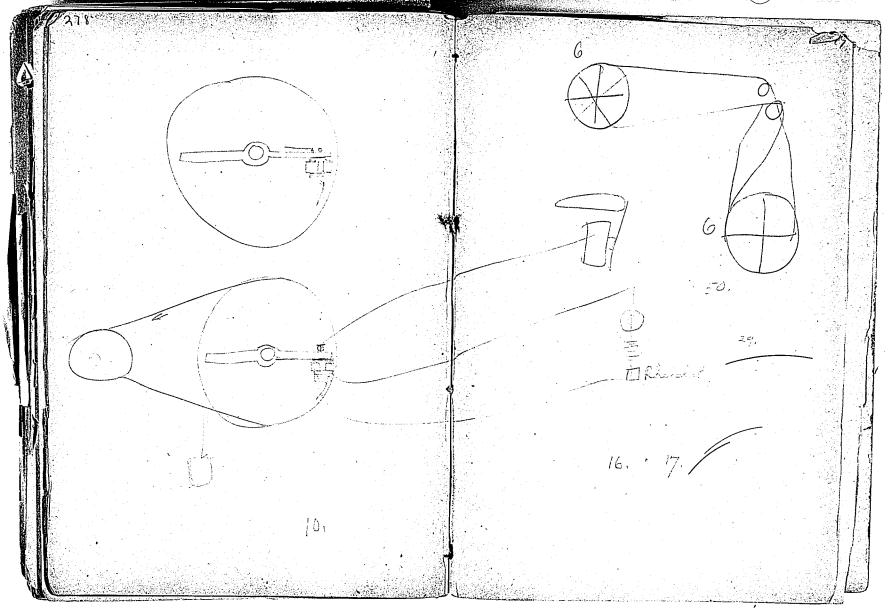
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Rivet
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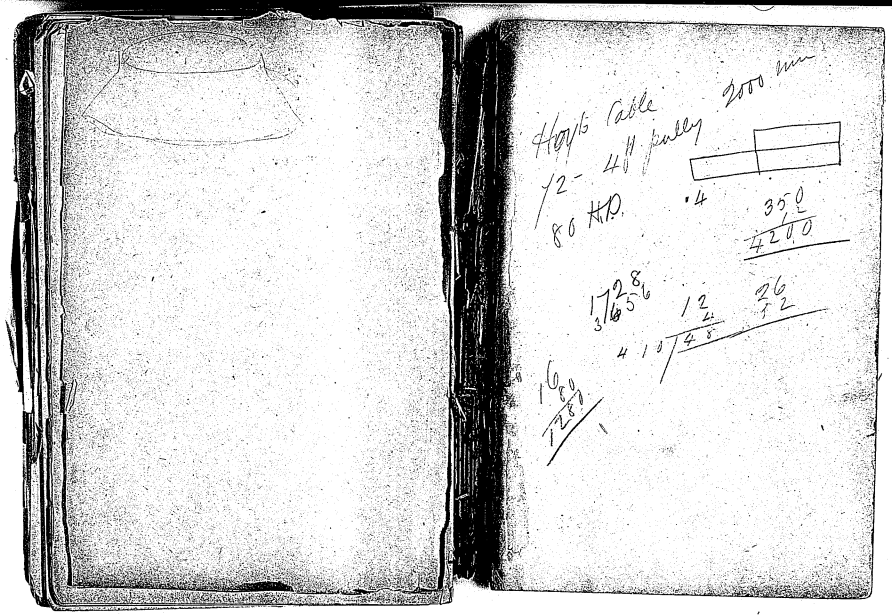
Hoyle Cable
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80 H.P.
4
350
4200
1728
3/16
12
26
12
48
410
1680
128